

WINDOWS

Estimation of upfront embodied carbon impacts.

Illustrated per m² of window area (not glazing area).

Based on available EPD information; the figures represent averages taken from available EPDs at the time of writing (2025).

Includes window frames and triple-glazing with an approximate U-Value of 0.8W/m²K.



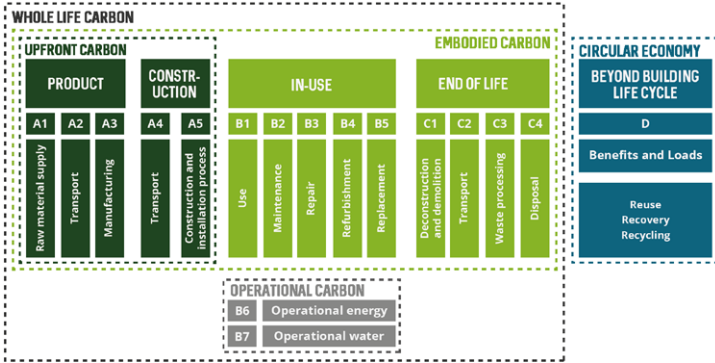
EPDs are usually based on a notional window size of 1.23m x 1.48m.



FIGURES IN WINDOW EPDs VARY SIGNIFICANTLY BETWEEN DIFFERENT MANUFACTURERS AND PRODUCTS. THE UPFRONT EMBODIED CARBON IMPACT OF WINDOWS IS DEPENDENT ON THE WINDOW'S SIZE AND ARRANGEMENT, THE FRAME TO GLAZING RATIO, THE NUMBER OF MULLIONS OR TRANSOMS AS WELL AS OPENING STYLE AND OF COURSE WHETHER IT'S DOUBLE OR TRIPLE GLAZING.

EMBODIED CARBON IMPACTS OF WINDOWS, ESPECIALLY IF DECIDING BETWEEN DOUBLE AND TRIPLE GLAZING, NEED TO BE BALANCED WITH SOLAR GAINS AND ENERGY LOSSES.

IT'S ALSO IMPORTANT TO THINK ABOUT SERVICE LIFE, MAINTENANCE AND REPLACEMENT CYCLES; THESE CAN VARY BETWEEN THE FRAMES AND GLAZING UNITS.



WE FOCUS ON UPFRONT CARBON AS THEY ARE MOST LIKELY THE MAJORITY OF EMBODIED CARBON IMPACTS ASSOCIATED WITH A PROJECT.

INCLUDED ARE PRODUCT STAGES A1-A3, PLUS TRANSPORT A4 TO WALES AND MATERIAL WASTE FROM CONSTRUCTION INSTALLATION A5W.

EXCLUDED ARE EMISSIONS DUE TO ENERGY USAGE ON SITE DURING CONSTRUCTION INSTALLATION A5A.

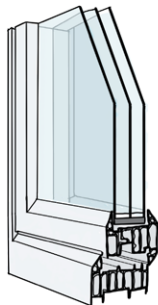
EMBODIED CARBON IMPACTS

WINDOWS

EMBODIED CARBON: EXAMPLE OF WINDOWS

A1-A4 plus A5 site wastage only (excludes A5.2)
triple-glazed, approximately 0.8W/m²K

uPVC

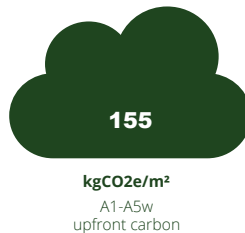
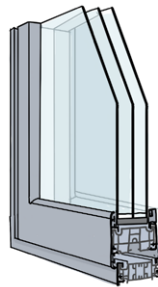


Estimated
Upfront Carbon
Impacts
Per m² window
area



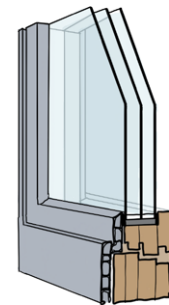
Biogenic
carbon stored
0
kgCO₂e/m²

Aluminium



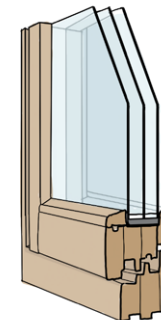
Biogenic
carbon stored
0
kgCO₂e/m²

Aluminium-Timber
Composite



Biogenic
carbon stored
20
kgCO₂e/m²

Timber



Biogenic
carbon stored
20
kgCO₂e/m²



FIXED GLAZING HAS A LOWER CARBON IMPACT THAN OPENING WINDOWS OR COMPLEX WINDOWS WITH HIGHER FRAME PROPORTIONS.

WINDOW EPDs TEND TO BE BASED ON A STANDARD WINDOW SIZE OF 1.23M x 1.48M, WHICH MEANS THEY ASSUME A COMPARABLE BASELINE FRAME-TO-GLAZING RATIO. AS THE SIZE OF A WINDOW INCREASES FROM THAT COMMON BASELINE (AND THEREFORE THE PROPORTION OF FRAME TO GLAZING REDUCES), THE UPFRONT EMBODIED CARBON IMPACT PER SQUARE METER LIKELY REDUCES.



WHILE TIMBER WINDOWS MAY NEED A LITTLE MORE MAINTENANCE, THEY CAN LAST FOR 60 TO 80 YEARS WITH PROPER CARE AND TREATMENT!